
بسم الله الرحمن الرحيم


إني أحبكم في الله

Pulmonary Manifestations of Systemic Lupus Erythematosus

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- At some time during their course, **most patients** with systemic lupus erythematosus (SLE) show signs of involvement of the lung, its vasculature, the pleura, and/or the diaphragm.

- Pleurisy, coughing, and/or dyspnea are often the **first clues** to either lung involvement or SLE itself.

Acute Lung Syndromes in Systemic Lupus Erythematosus
Community-acquired or immunocompromised pneumonias
Pleurisy
Pulmonary embolization
Uremic pneumonitis
Cardiogenic pulmonary edema
Acute reversible hypoxemia syndrome
Acute lupus pneumonitis
Diffuse alveolar hemorrhage

Cosgrove GP & Schwarz MI, Fishman's Pulmonary Diseases and Disorders, 2008

Infections

- Infection can be **community-acquired** or **result from immunosuppressive treatment.**

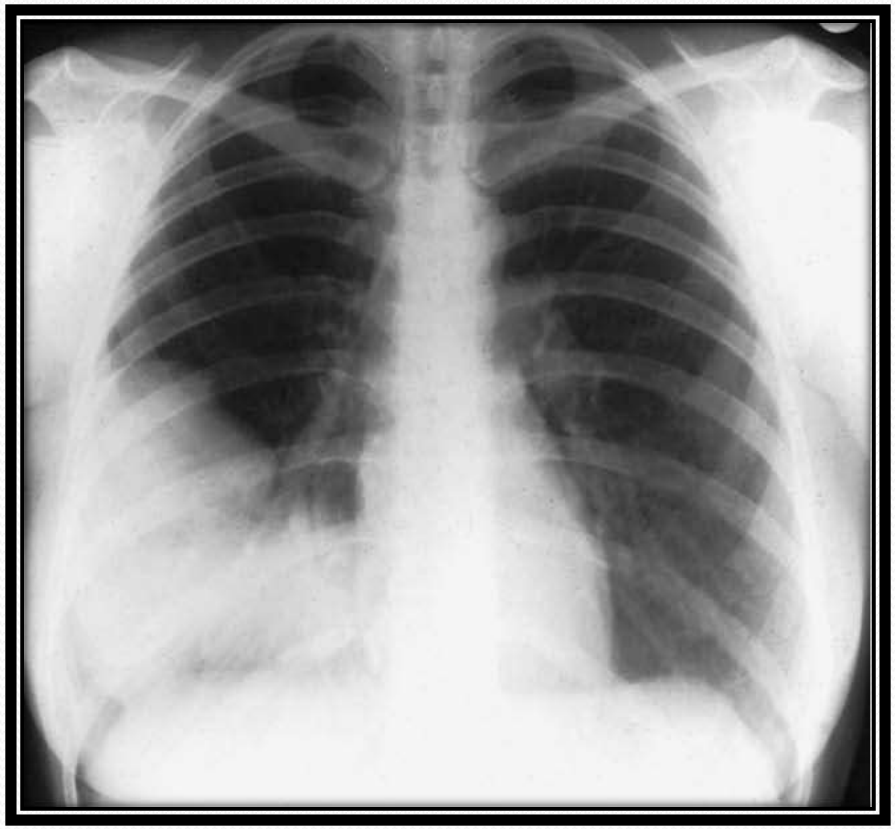
- Infectious pneumonia represents the **most common** cause of pulmonary disease in SLE, and infections in general represent the most common reason for death (33 to 77 %) in these patients.

- **BAL** is often helpful in excluding an infectious pneumonia in the immunocompromised SLE patient.

Lupus Pleuritis

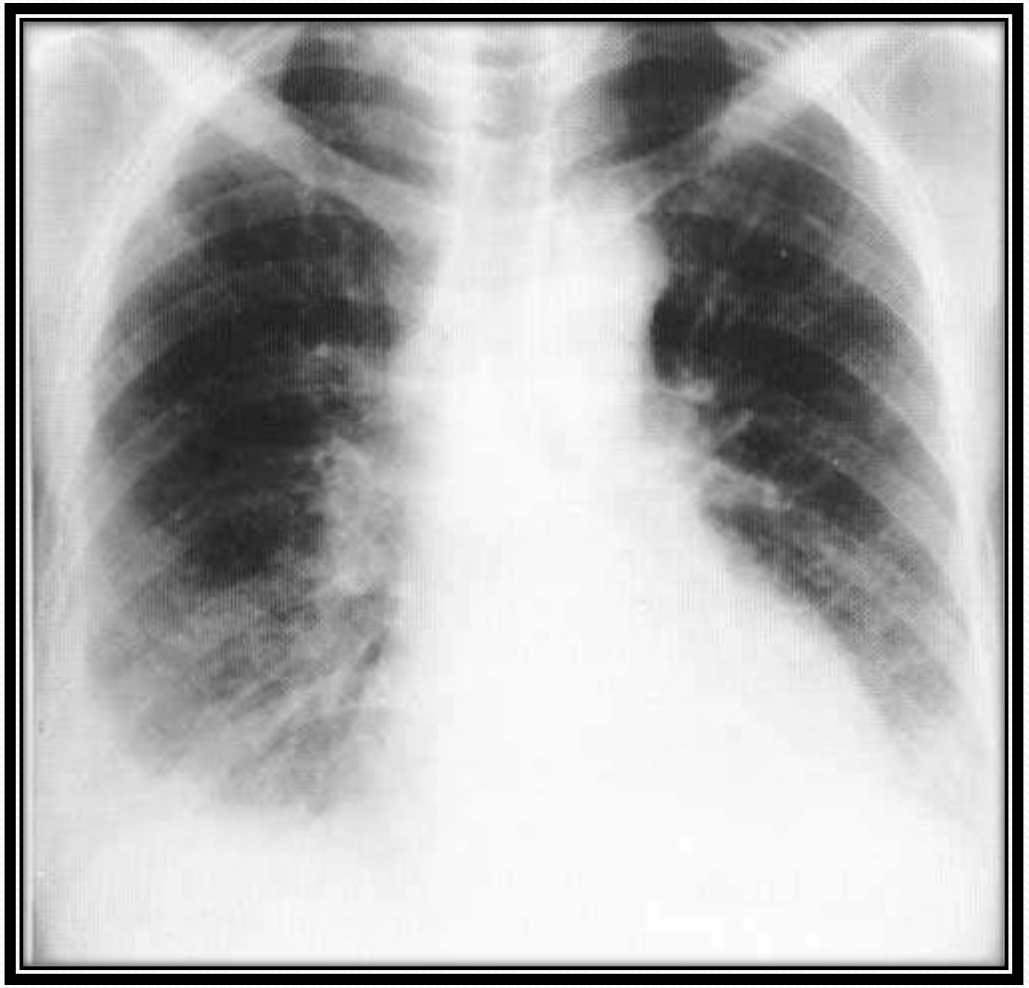
- Pleurisy and pleural effusion are the **most common** primary pulmonary complications of SLE, occurring in **50 to 80 %** of patients.
- They may also be the presenting and sole manifestation of the disease.
- They are usually **recurrent** and may accompany more severe complications such as acute lupus pneumonitis or nephritis.

- Patients complain of pleuritic pain, fever, and dyspnea.
- The chest radiograph may be **normal** (dry pleurisy) or demonstrate **small to moderate pleural effusions** (massive effusions are rare).
- **Bilateral** in 50 % of patients.
- When unilateral, there is **no predilection** for either side.





Encysted pleural effusion (in the oblique fissure) in a case with SLE.



Bilateral pleural effusions in patient with SLE

- Effusions are serous or serosanguineous and exudative in nature.
- The white cell counts range from 5 to 10,000 cells/mm^3.
- Early on, **neutrophils** predominate, but with time **mononuclear** cells appear.
- Pleural fluid **glucose** concentration is **not reduced**.

- **Rheumatoid factor** may be **positive**.
- Pleural fluid **complement** is **reduced**.
- A positive **double-stranded pleural fluid DNA titer** is **non-specific** since it has been found in pleural effusions due to malignancy and tuberculosis.
- **The most helpful measurement** is the **pleural fluid antinuclear antibody titer.** Levels greater than **1:160** are very suggestive of lupus pleuritis.

- **Lupus erythematosus (LE) cells** are found **occasionally** in serous effusions in SLE.

- Some have regarded the presence of LE cells in serous effusions as virtually diagnostic of SLE, an approach which is no longer favored….**WHY?**

  - They are subject to observer variation
  - They have also been reported in effusions from rheumatoid joints, malignant pleural effusions and in pleural fluid, without clinical evidence of SLE.
  - They are not found in the pleural fluid of all patients with lupus pleuritis

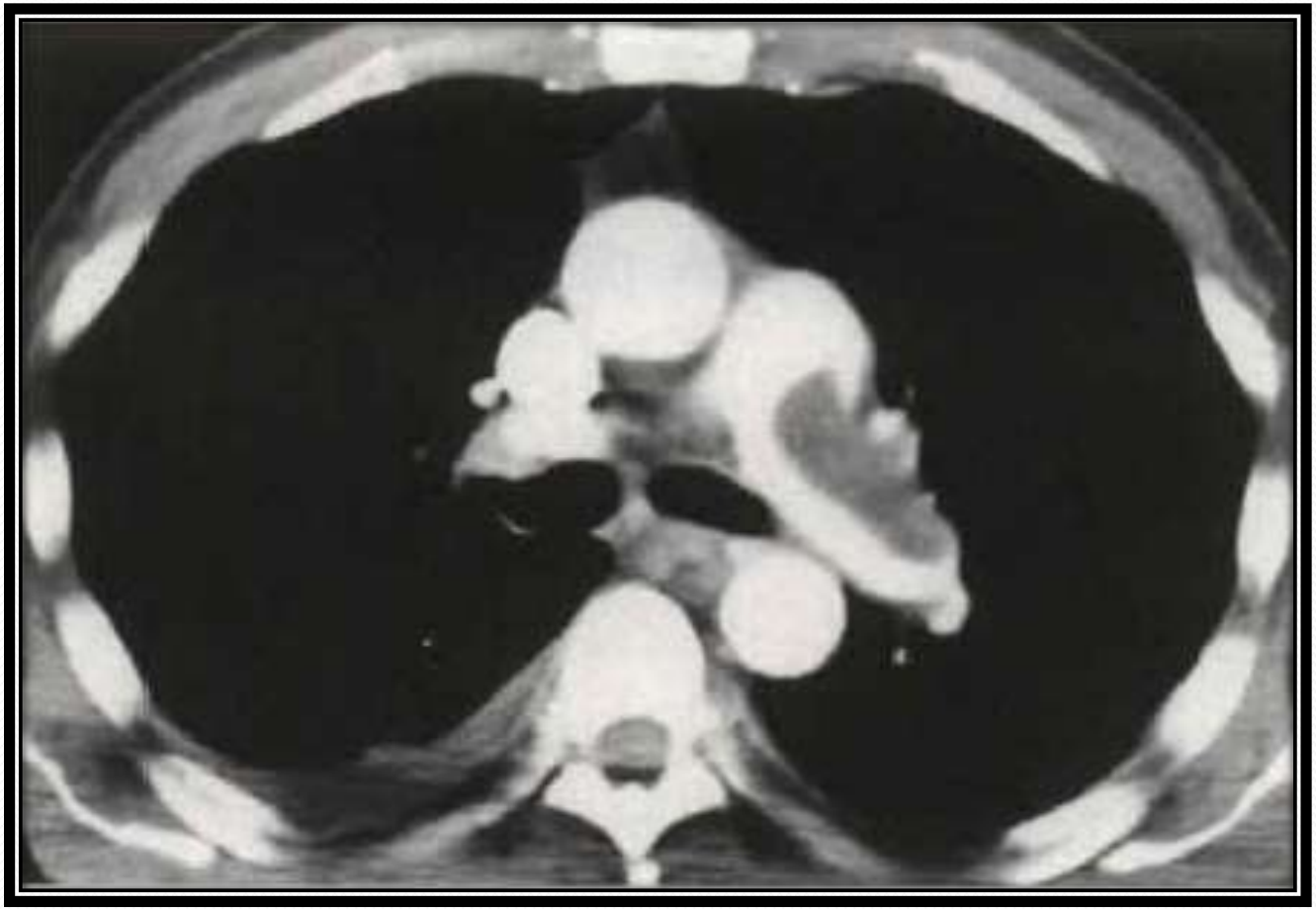
- Pleuritic pain in SLE may respond to **non-steroidal anti-inflammatory agents,** and almost always responds to **corticosteroid therapy**.
- Sometimes, high doses may be needed for large effusions and severe pleuritis.
- **Immunosuppressants** may be efficacious.
- **Monthly cyclosporine** courses have been used with a good outcome.
- Recurrent pleural effusions usually respond to **pleurodesis**.

Differential diagnosis:

- Parapneumonic effusions and empyema.
- Congestive heart failure.
- Effusions secondary to thromboembolic disease.

Pulmonary embolism

- It occurs in up to **25 %** of patients and a significant cause of mortality.
- The occurrence of thromboembolic disease correlates with the presence in the serum of **acquired antiphospholipid antibodies.**
- Up to a **third** of patients with SLE have the **antiphospholipid syndrome**.

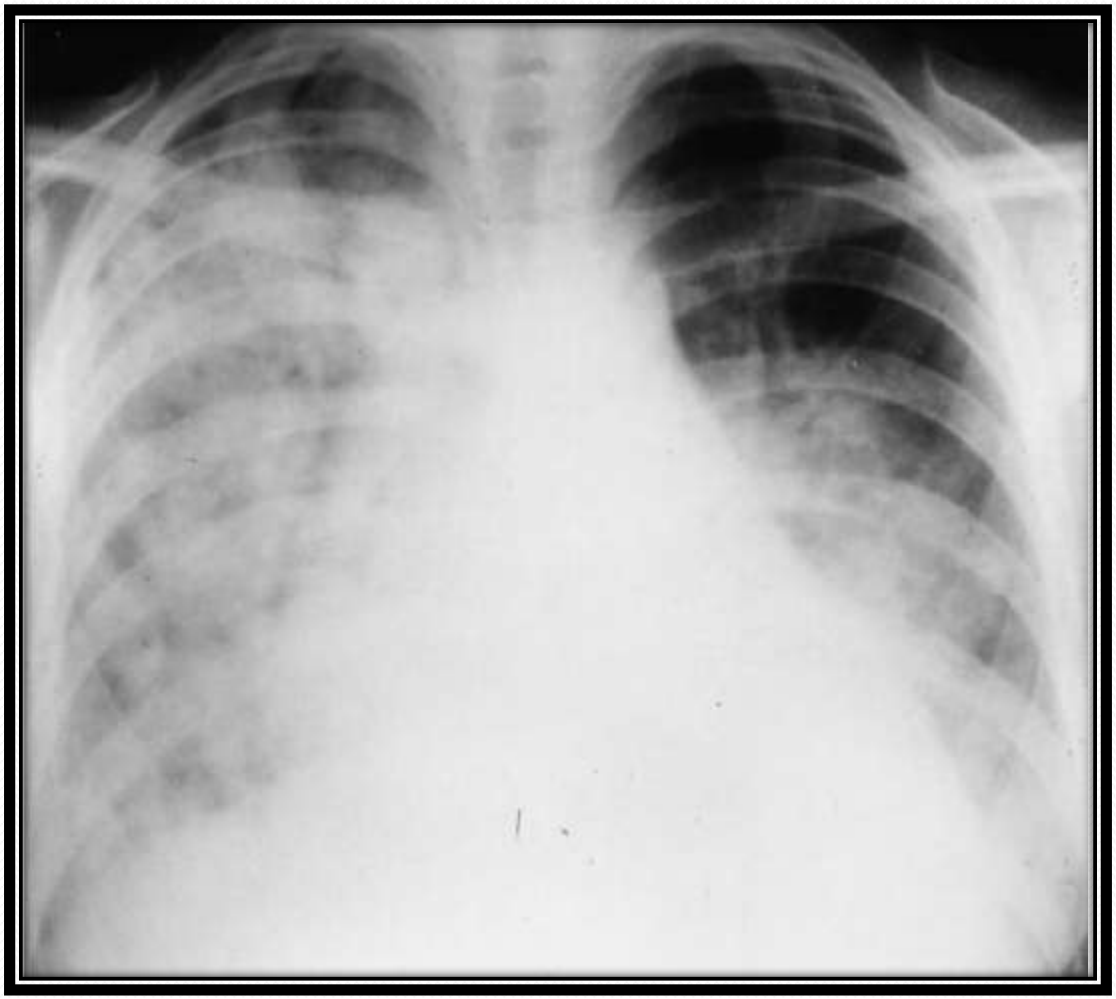


Acute Lupus Pneumonitis

- Acute lupus pneumonitis is an **uncommon** (1 to 12 %) manifestation of SLE

- In those with an established diagnosis, it also **appears during a flare-up** of the other systemic manifestations of SLE, particularly pleuritis, pericarditis, arthritis, and nephritis.

- Acute lupus pneumonitis is characterized by fever, cough (sometimes with hemoptysis), pleurisy & dyspnea.



Acute lupus pneumonitis. The chest radiograph demonstrates diffuse alveolar filling with cardiomegaly & left pleural effusion.

- White blood cell counts ⟶ elevated
- Sedimentation rates ⟶ elevated
- **Serum complement** ⟶ **low**

- Because of the difficulty in distinguishing acute lupus pneumonitis from an infectious pneumonia, a **BAL** and sometimes an **open lung biopsy** are indicated prior to instituting anti-inflammatory and immunosuppressive therapy.

Treatment recommendations

- **Broad spectrum antibiotic coverage** should be given pending culture results.
- The mainstay of therapy is **systemic pridnisone** (1to 1.5 mg/kg per day in divided doses).
- If no response is seen within 72 hours, the administration of **intravenous pulse steroids** (up to one gram of **methylprednisolone** per day for three days) **and** addition of slower acting immunosuppressive drugs such as **cyclophosphamide** should be considered.

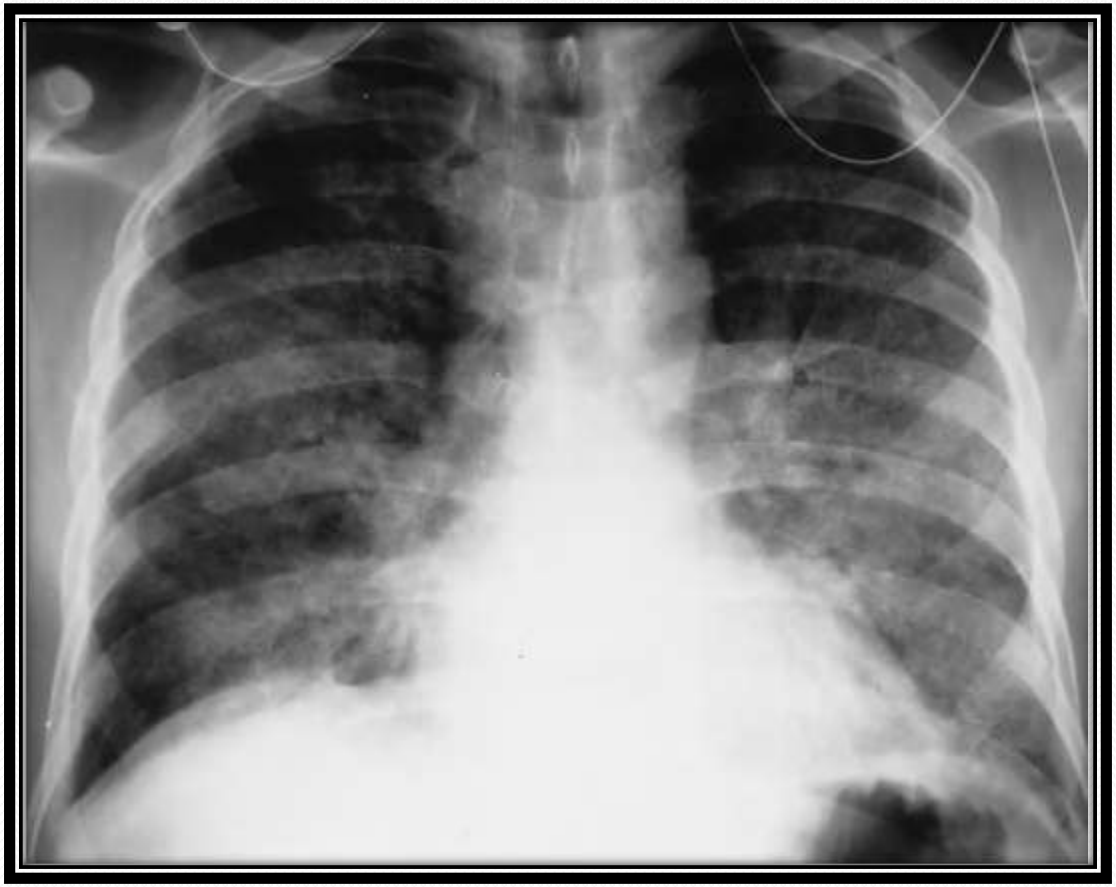
Patients with **marked tachypnea or hypoxemia** and those in whom **diffuse alveolar hemorrhage** is suspected may benefit from **immediate use** of intravenous high-dose **methylprednisolone** rather than a trial of oral glucocorticoids.

Diffuse Alveolar Hemorrhage

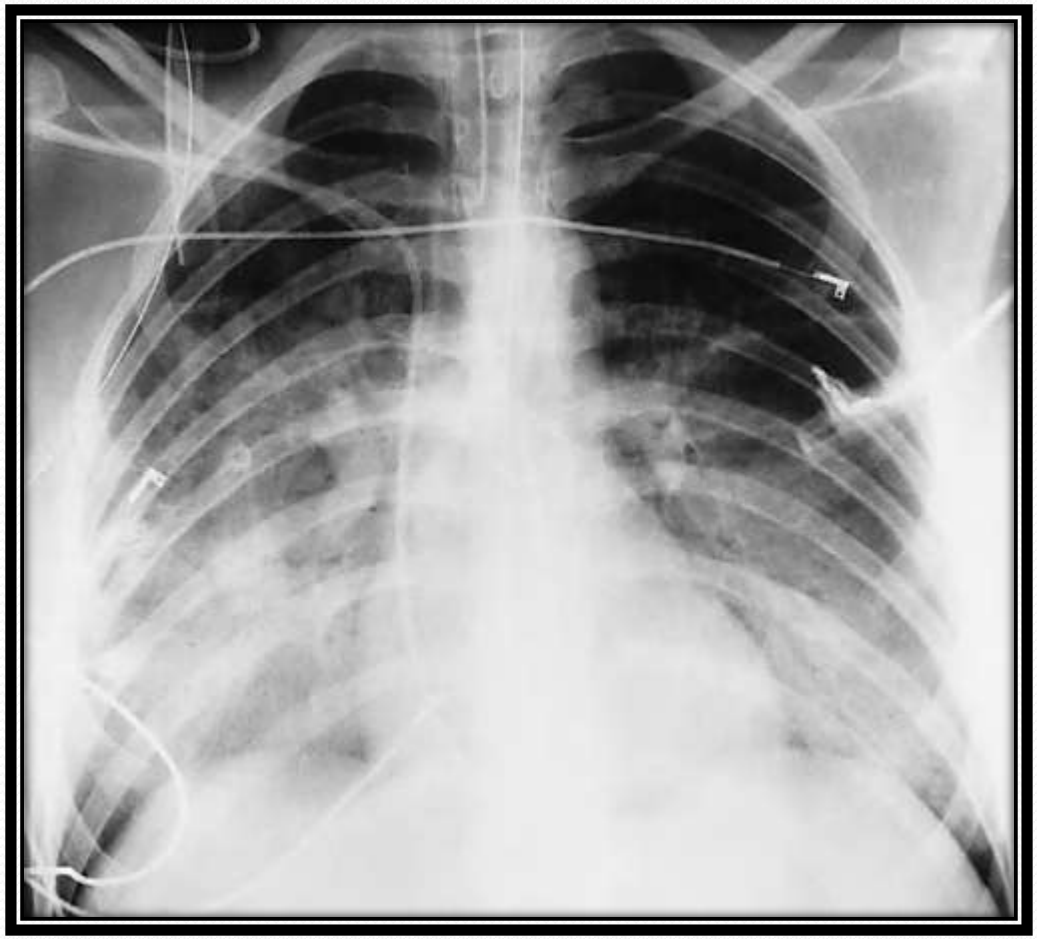
- DAH accounts for **1 to 4 %** of SLE-related hospitalizations.

- **Hemoptysis** is present in **30 to 50 %** of patients during their initial presentation, but up to **90 %** will have hemoptysis during their subsequent course.

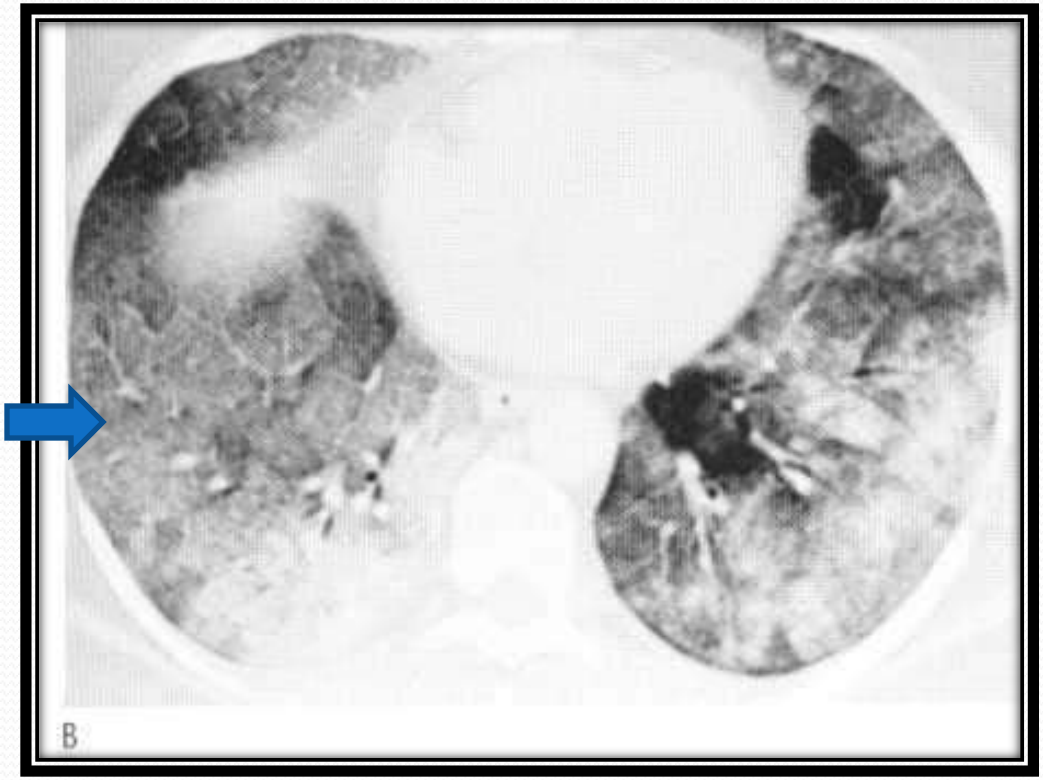
- **Hematocrit** ⟶ falls
- **Active glomerulonephritis** ⟶ 60-90 %
- **BAL** ⟶ Progressively serosanguineous BAL
  ⟶ hemosiderin-laden macrophages
- **DLCO** ⟶ **increased**



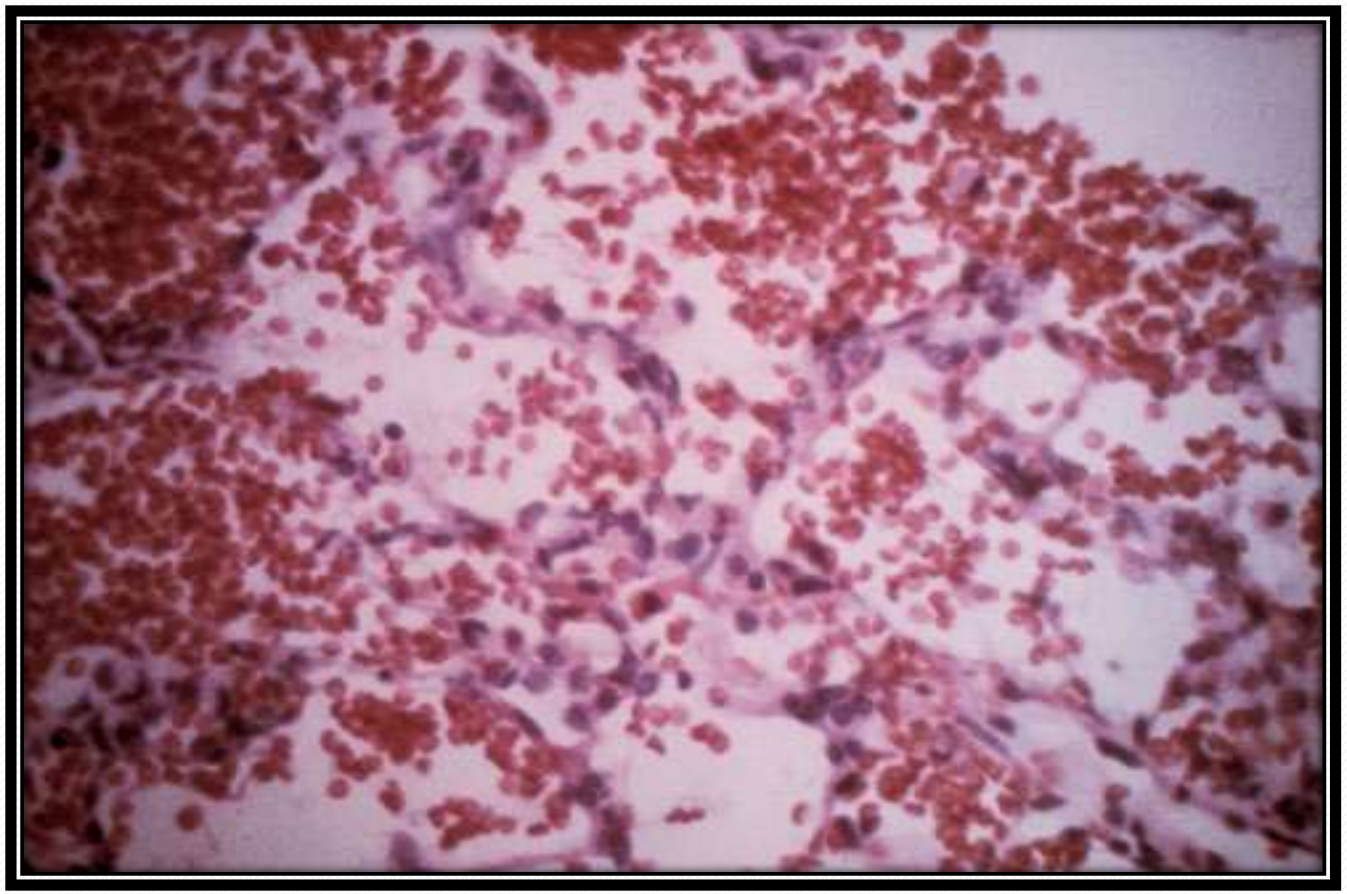
DAH in SLE. There are diffuse alveolar infiltrates without cardiomegaly or pleural effusions



DAH. Extensive bilateral alveolar infiltrates in a 22-year-old woman with SLE, hemoptysis, and anemia.


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DAH. Postmortem lung biopsy demonstrates large numbers of red blood cells within alveolar spaces.

Differential diagnosis

- Lupus pneumonitis
- Opportunistic infections
- Congestive heart failure
- Uremia
- Pulmonary embolism

- The mortality rate is approximately **50 %**.
- **Recurrence** is the rule rather than the exception.

Treatment:

- Once infection has been excluded, corticosteroids are the mainstay of therapy. Intravenous **methylprednisolone**, 1 to 2 grams daily in divided doses for 3 to 4 days prior to tapering, should be considered.

- **Concomitant** oral or parenteral **cyclophosphamide** or **azathioprine** is commonly administered.

- **Plasmapheresis** and immunoglobulin therapy have no proven efficacy to date, (should be reserved for patients with severe DAH refractory to corticosteroids and/or cytotoxic agents).

- Following the 3-day pulse, **corticosteroids** (dose of methylprednisolone 60 to 120 mg per day or equivalent) should be continued for a few days, until control of the bleeding and extrapulmonary manifestations has been achieved.

- The subsequent dose and rate of corticosteroid taper need to be individualized, based upon clinical, radiographic, and serological response.

Acute reversible hypoxemia syndrome

- It occurs in acutely ill SLE patients who are experiencing **systemic exacerbations**.
- These patients have **hypoxemia** and **a widened alveolar-arterial oxygen gradient**, **but** both the chest radiograph and ventilation-perfusion lung scans are **normal**.
- It is postulated that there is **complement-activated neutrophil aggregation** in the pulmonary vasculature.
- The hypoxemia improves with immunosuppressive therapy.
- It should be considered only after excluding thromboembolic disease.

Other pulmonary disorders

Volume overload:

- It is due either to **renal failure** or to **congestive heart failure** secondary to myocarditis.

Uremic pneumonitis

- Uremic pneumonitis with underlying DAD is also a possible cause of an acutely dyspneic SLE patient with renal failure.

Interstitial Lung Disease

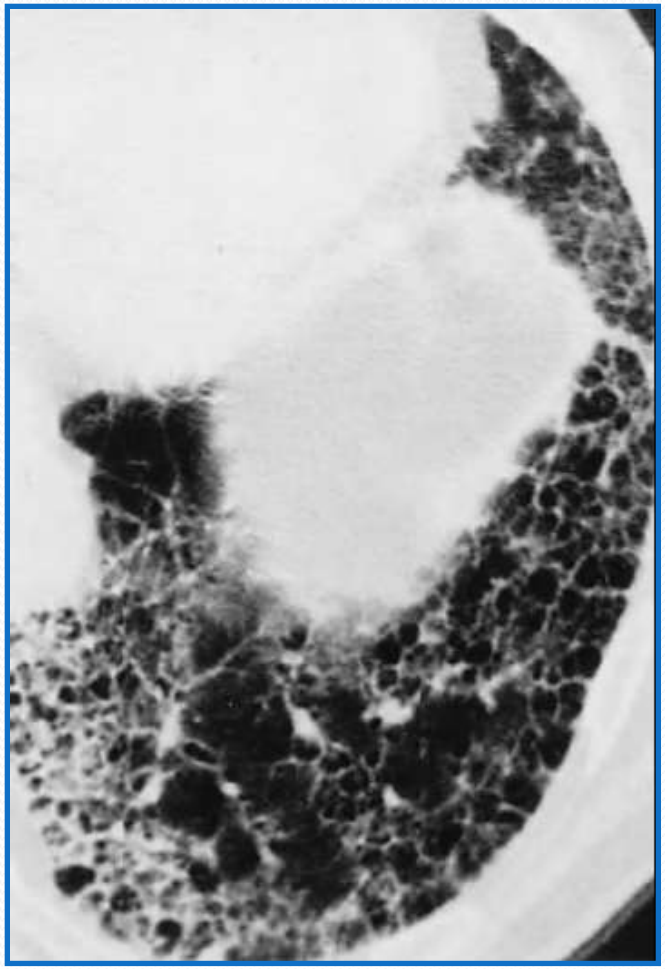
Types:

- UIP
- Lymphocytic interstitial pneumonitis
- NSIP
- Bronchiolitis obliterans organizing pneumonia

- The prevalence of interstitial lung disease is **increased** in the subset of SLE patients with features suggestive of an **mixed connective-tissue disease.**

HRCT

It indicates combinations of ground-glass attenuation, inter- and intralobular septal thickening, and honeycomb change.



Pulmonary function tests

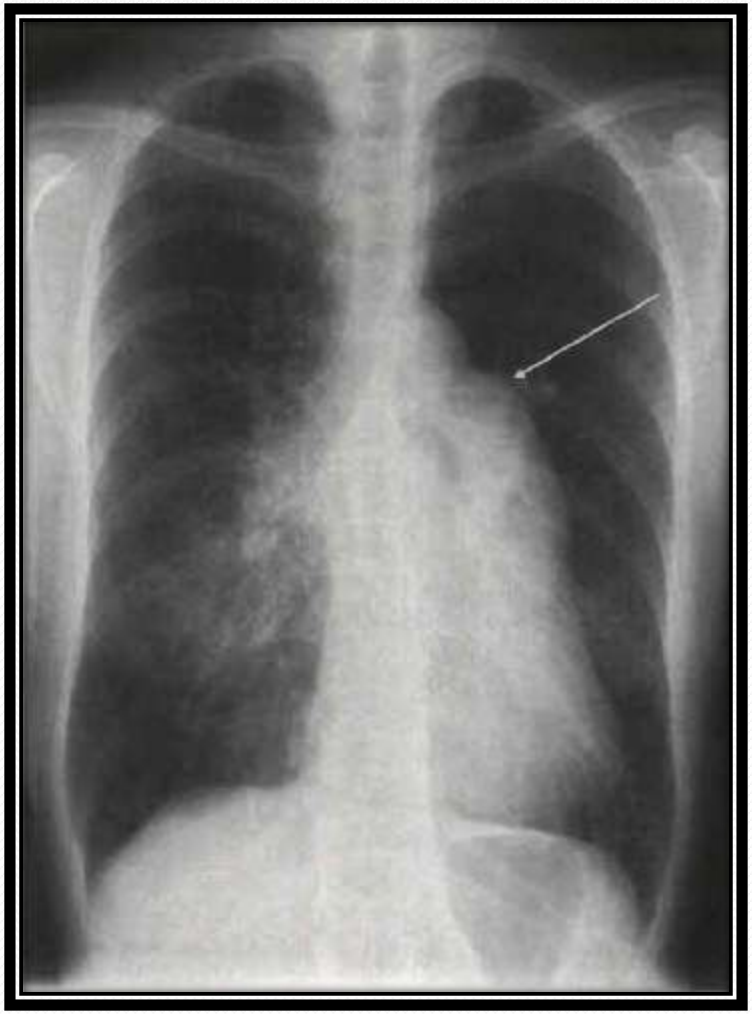
- Restrictive pattern
- Reduction in the diffusing capacity
- Hypoxemia accentuated by exercise

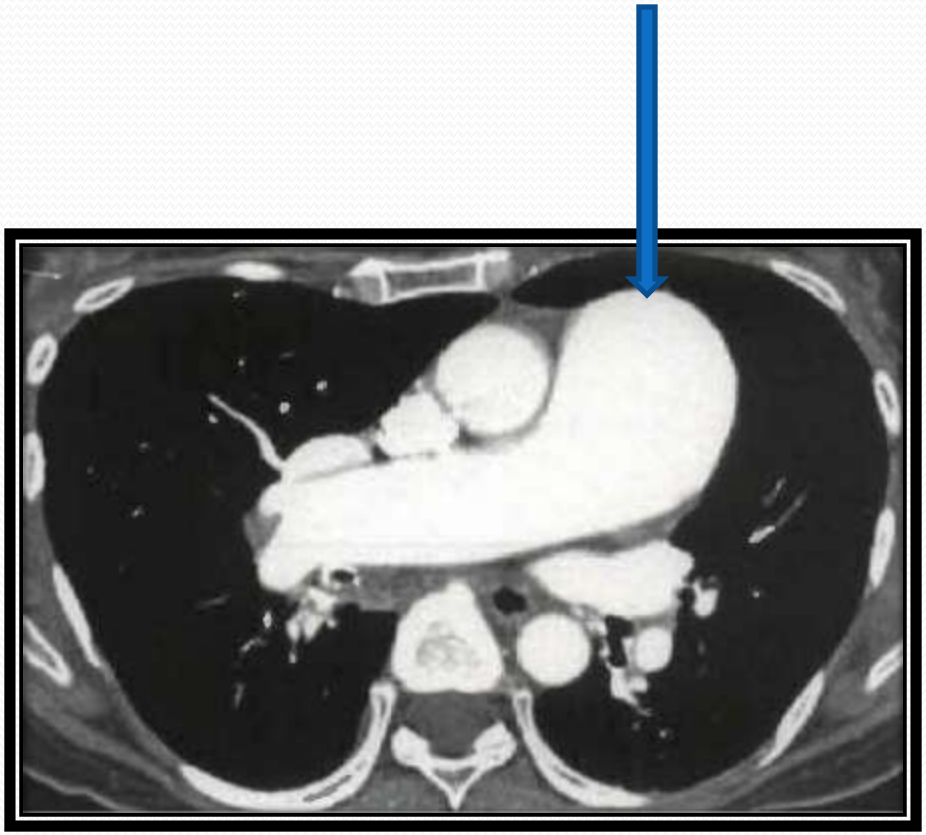
Response to therapy

- Those cases with underlying **NSIP** or **organizing pneumonia** are **more likely to respond to treatment** than those who demonstrate excess collagen deposition and cystic honeycomb formation

Idiopathic pulmonary hypertension

- It occurs in **1 to 9 %** of patients.
- Patients complain of **dyspnea** and **fatigue** but have normal chest radiographs. In advanced cases, pulmonary arterial enlargement appears.
- There is often an **isolated reduction of the DLCO** as well as gas exchange abnormalities.
- **Therapeutic options** include vasodilator therapy, anticoagulation, immunosuppression with cyclophosphamide, and transplantation.





Bronchiolitis

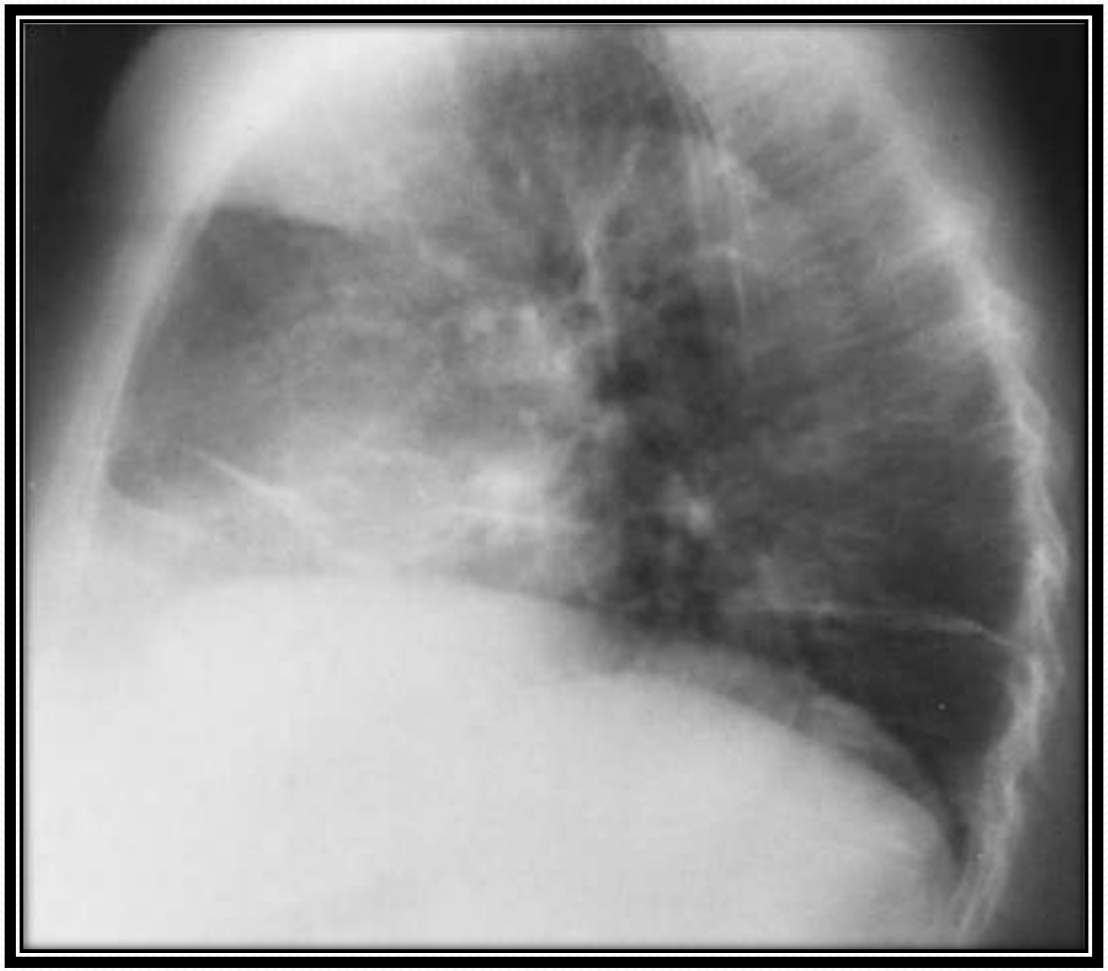
- Obliterative bronchiolitis
- Bronchiolitis obliterans organizing pneumonia
- Bronchiectasis (may occur in up 20 % of patients)

Large airway involvement

- Tracheal and subglottic stenosis
- Vocal fold paralysis
- Epiglottitis
- Necrotizing tracheitis

Respiratory Muscle Dysfunction

- It is found in **25 %** of patients with SLE.
- This accounts for the previously unexplained findings of dyspnea without evidence of interstitial or pulmonary vascular disease.
- This has been referred to as ***unexplained dyspnea and shrinking lungs syndrome.***
- The pathogenesis remains **unexplained**. Abnormal diaphragmatic activation, due in part to voluntary inhibition due to pleuritic pain, may contribute to diaphragmatic dysfunction in this disorder.



Diaphragmatic dysfunction in SLE. There is diaphragmatic elevation resulting in plate-like atelectasis

- **Corticosteroids** are **not** a frequently effective treatment modality.

- **Positive pressure ventilation** (CPAP or BiPAP), particularly at night, may improve these patients' daytime symptoms.


Thank You
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